Self Diagnosis Supported model

SERVICE MANUAL

AE-6B CHASSIS

MODEL	COMMANDER	DEST	CHASSIS NO.
KV-28LS60B	RM-932	FR	SCC-Q83C-A
KV-28LS60E	RM-932	ESP	SCC-Q81E-A
KV-28LS60U	RM-932	UK	SCC-Q84D-A

MODEL	COMMANDER	DEST	CHASSIS NO.
KV-32LS60B	RM-932	FR	SCC-Q83B-A
KV-32LS60E	RM-932	ESP	SCC-Q81D-A
KV-32LS60K	RM-932	OIRT	SCC-Q82C-A
KV-32LS60U	RM-932	UK	SCC-Q84C-A

FD Trinitron

KV-28/32LS60

RM-932

TRINITRON ® COLOR TV

SONY®

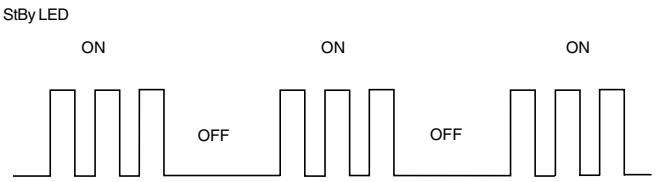
AE-6B SELF DIAGNOSTIC SOFTWARE

The identification of errors within the AE-6B chassis is triggered in one of two ways :- 1: Busy or 2: Device failure to respond to IIC. In the event of one of these situations arising the software will first try to release the bus if busy (Failure to do so will report with a continuous flashing LED) and then communicate with each device in turn to establish if a device is faulty. If a device is found to be faulty the relevant device number will be displayed through the LED (Series of flashes which must be counted) See table 1, non fatal errors are reported using this method.
Each time the software detects an error it is stored within the NVM. See Table 2.

Table 1

Error Message	LED Code
No error	00
Reserved	01
OCP (Over Current Protection)	02
Over Voltage Protection	03
No Vertical Sync	04
IKR Error at power on	05
IIC bus clock and/or data lines low at power on	06
NVM no IIC bus acknowledge at power on	07
Horizontal Protection	08
Tuner no acknowledge at power on	09
Sound Processor Error	10
Reserved	11
Scanrate Error	12
DAC Error	13
Backend Error	14
Dynamic Convergence Error	15
PIP Error	16

Flash Timing Example : e.g. error number 3



How to enter into Table 2

1. Turn on the main power switch of the TV set.
2. Program Remote Commander for Operation in Service Mode. [See Page 22].
3. Press 'VIDEO' 'VIDEO' > 'MENU' on the Remote Commander.
4. Using the Remote Commander, Scroll to the 'Error Menu' item using the down arrow key, then press the right arrow key.
5. The following table will be displayed indicating the error count.

Table 2

ERROR MENU			
E02	OCP	(0, 255)	0
E03	OVP	(0, 255)	0
E04	VSYNC	(0, 255)	0
E05	IKR	(0, 255)	0
E06	IIC	(0, 255)	0
E07	NVM	(0, 255)	0
E08	HPROT	(0, 255)	0
E09	TUNER	(0, 255)	0
E10	SOUNDP	(0, 255)	0
E11	-	(0, 255)	0
E12	SCANRATE	(0, 255)	0
E13	DAC	(0, 255)	0
E14	BACKEND	(0, 255)	0
E15	DYN CON	(0, 255)	0
E16	PIP	(0, 255)	0
WORKING TIME			
HOURS			14
MINUTES			7

Note: To clear the error count data press '80' on the Remote commander.

SECTION 4 CIRCUIT ADJUSTMENTS

4-1. Electrical Adjustments

Service adjustments to this model can be performed using the supplied remote Commander RM-932.

Programming the Remote Commander for Operation in Service Mode

1. Press the VCR/TV/DVD button until the TV LED lights.
2. Press and hold the yellow button for approx. 5 seconds until the TV LED flashes quickly.
3. Press 99999. All three LED's should light.
   The remote commander is now set to Service Mode.
4. To return the remote commander to normal operation mode repeat steps 1. and 2. then press 00000. All three LED's should light.
   The remote commander is now set to normal mode.

Setting the TV into Service Mode

1. Program the remote commander for operation in Service Mode as described above.
2. Turn on the TV main power switch.
3. Press the video standby button on the remote commander twice.
   'TT __' will appear in the upper right corner of the screen.
   Other status information will also be displayed.
4. Press 'MENU' on the remote commander to obtain the following menu on the screen.

```
Geometry
Service
Scanrate
DAC
Dyn. Conv.
PiP
Sound
IF adjust
Error Menu

AE6B v0.14 (Jun 2001)
Factory data FFh  FFh
MSP Device : MSP3411G
```

5. Move to the corresponding adjustment item using the up or down arrow buttons on the Remote Commander.
6. Press the right arrow button to enter into the required menu item.
7. Press the 'Menu' button on the Remote Commander to quit the Service Mode when all adjustments have been completed.

Note :

- After carrying out the service adjustments, to prevent the customer accessing the 'Service Menu' switch the TV set OFF and then ON.

GEOMETRY

ABL TH	(0, 3)	0
ABL MODE	(0, 3)	0
P ABL	(0, 15)	15
V SIZE	(0, 63)	35
V POSITION	(0, 63)	33
V COMP	(0, 3)	1
V LIN	(0, 15)	7
S CORRECTION	(0, 15)	7
H SIZE	(0, 63)	44
PIN AMP	(0, 63)	32
UP CORNERPIN	(0, 63)	29
M PIN	(0, 3)	2
LO CORNERPIN	(0, 63)	29
TRAPEZIUM	(0, 15)	2
H POSITION	(0, 63)	40
AFC BOW	(0, 15)	8
AFC ANGLE	(0, 15)	9
LEFT BLK	(0, 63)	34
RIGHT BLK	(0, 63)	17
V ASPECT	(0, 63)	47
AKBTIM1	(0, 3)	2
AKBTIM2	(0, 1)	0
IKR		*1*
HNG		*0*
VNG		*0*

DYN. CONV.

RANGE	(0, 63)	63
YupL	(0, 1)	0
VAL	(0, 63)	30
YlowL	(0, 1)	0
VAL	(0, 63)	31
MBOWupL	(0, 1)	0
VAL	(0, 63)	31
MBOWlowL	(0, 1)	0
VAL	(0, 63)	32
HAMPL	(0, 1)	0
VAL	(0, 63)	37
YupR	(0, 1)	0
VAL	(0, 63)	30
YlowR	(0, 1)	0
VAL	(0, 63)	30
MBOWupR	(0, 1)	0
VAL	(0, 63)	32
MBOWlowR	(0, 1)	0
VAL	(0, 63)	32
HAMPR	(0, 1)	0
VAL	(0, 63)	36
UP Y	(0, 1)	0
VAL	(0, 63)	31
LOW Y	(0, 1)	0
VAL	(0, 63)	33
H STAT	(0, 1)	0
VAL	(0, 63)	33
UP CORR	(0, 1)	0
VAL	(0, 63)	34
LOW CORR	(0, 1)	0
VAL	(0, 63)	19

IF ADJUST	
Automute	1
Audio Gain	0
L Gating	0

SERVICE		
SUB COL	(0, 63)	Adj
SUB HUE	(0, 63)	31
SUB SHARP	(0, 63)	30
SUB BRIGHT	(0, 63)	13
SUB CONT	(0, 15)	12
R-DRIVE	(0, 63)	50
G-DRIVE	(0, 63)	Adj
B-DRIVE	(0, 63)	Adj
R CUTOFF	(0, 63)	28
G CUTOFF	(0, 63)	24
B CUTOFF	(0, 63)	46
Br TXT	(0, 15)	7
Br OSD	(0, 15)	10

DAC		
CONFIG	*00000000*	
MPIN CONT	(0, 255)	96
HLIN	(0, 255)	83
HTRAP	(0, 255)	127
ROT. COIL	(0, 255)	130
PHOCUS PH	(0, 255)	90

SOUND		
M-N	(0, 511)	200
M-D	(-128, -1)	-20
M-S	(+0, +127)	+20
S-M	(+0, +127)	+10
D-M	(-128, -1)	-10
N-M	(0, 1023)	496
BBE	(+0, +68)	+28
B1	(-96, +96)	+0
B2	(-96, +96)	+0
B3	(-96, +96)	+0
B4	(-96, +96)	+0
B5	(-96, +96)	+0
SW L	(-128, +0)	+0
SW F	(+5, +40)	+30
NICAM C AD	10001	
NICAM Error	(0, 2047)	0
Stereo	(-128, +127)	+0
Status	0000000110	

ERROR MENU			
E02	OCP	(0, 255)	0
E03	OVP	(0, 255)	0
E04	VSYNC	(0, 255)	0
E05	IKR	(0, 255)	0
E06	IIC	(0, 255)	0
E07	NVM	(0, 255)	0
E08	HPROT	(0, 255)	0
E09	TUNER	(0, 255)	0
E10	SOUNDP	(0, 255)	0
E11	-	(0, 255)	0
E12	SCANRATE	(0, 255)	0
E13	DAC	(0, 255)	0
E14	BACKEND	(0, 255)	0
E15	DYN CON	(0, 255)	0
E16	PIP	(0, 255)	0

WORKING TIME	
HOURS	14
MINUTES	7

Sub Brightness Adjustment

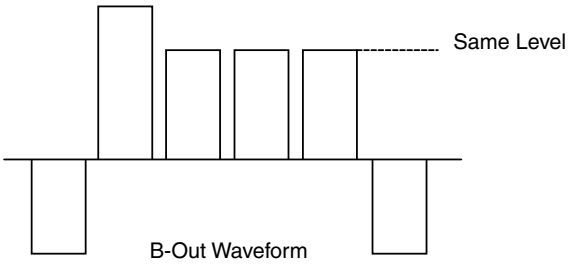
1. Input a Monoscope pattern.
2. Program the Remote Commander for operation in Service Mode. [See Page 22].
3. Press 'VIDEO' 'VIDEO' 13 on the Remote Commander.
4. Adjust the 'Sub-Brightness' data so that there is barely a difference between the 0 IRE and 10 IRE signal levels.

Sub Contrast Adjustment

1. Input a video signal that contains a small 100% white area on a black background.
2. Connect an digital voltmeter to Pin 10 of J7378 [C Board].
3. Program the Remote Commander for operation in Service Mode. [See Page 22].
4. Adjust the Sub-Contrast [Using 'VIDEO' 'VIDEO' '11'] to obtain a voltage of 105 +/- 5V.

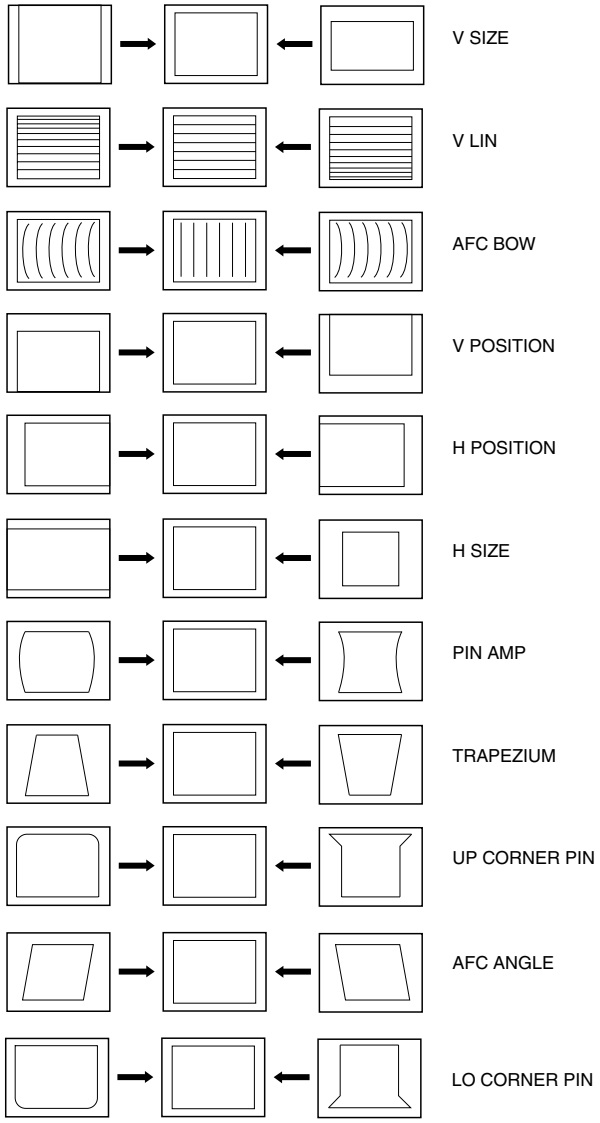
Sub Colour Adjustment

1. Receive a PAL colour bar signal.
2. Connect an oscilloscope to Pin 6 of CN7001 [A Board].
3. Program the Remote Commander for operation in Service Mode. [See Page 22].
4. Adjust the 'Sub Colour' [Using 'VIDEO' 'VIDEO' '12'] so that the Cyan, Magenta and Blue colour bars are of equal levels as indicated below.



Deflection System Adjustment

1. Program the Remote Commander for operation in Service Mode. [See Page 22] and enter into the 'Geometry' service menu.
2. Select and adjust each item in order to obtain the optimum image.



GEOMETRY		
ABL TH	(0, 3)	0
ABL MODE	(0, 3)	0
P ABL	(0, 15)	15
V SIZE	(0, 63)	35
V POSITION	(0, 63)	33
V COMP	(0, 3)	1
V LIN	(0, 15)	7
S CORRECTION	(0, 15)	7
H SIZE	(0, 63)	44
PIN AMP	(0, 63)	32
UP CORNERPIN	(0, 63)	29
M PIN	(0, 3)	2
LO CORNERPIN	(0, 63)	29
TRAPEZIUM	(0, 15)	2
H POSITION	(0, 63)	40
AFC BOW	(0, 15)	8
AFC ANGLE	(0, 15)	9
LEFT BLK	(0, 63)	34
RIGHT BLK	(0, 63)	17
V ASPECT	(0, 63)	47
AKBTIM1	(0, 3)	2
AKBTIM2	(0, 1)	0
IKR		*1*
HNG		*0*
VNG		*0*

4-2. TEST MODE 2:

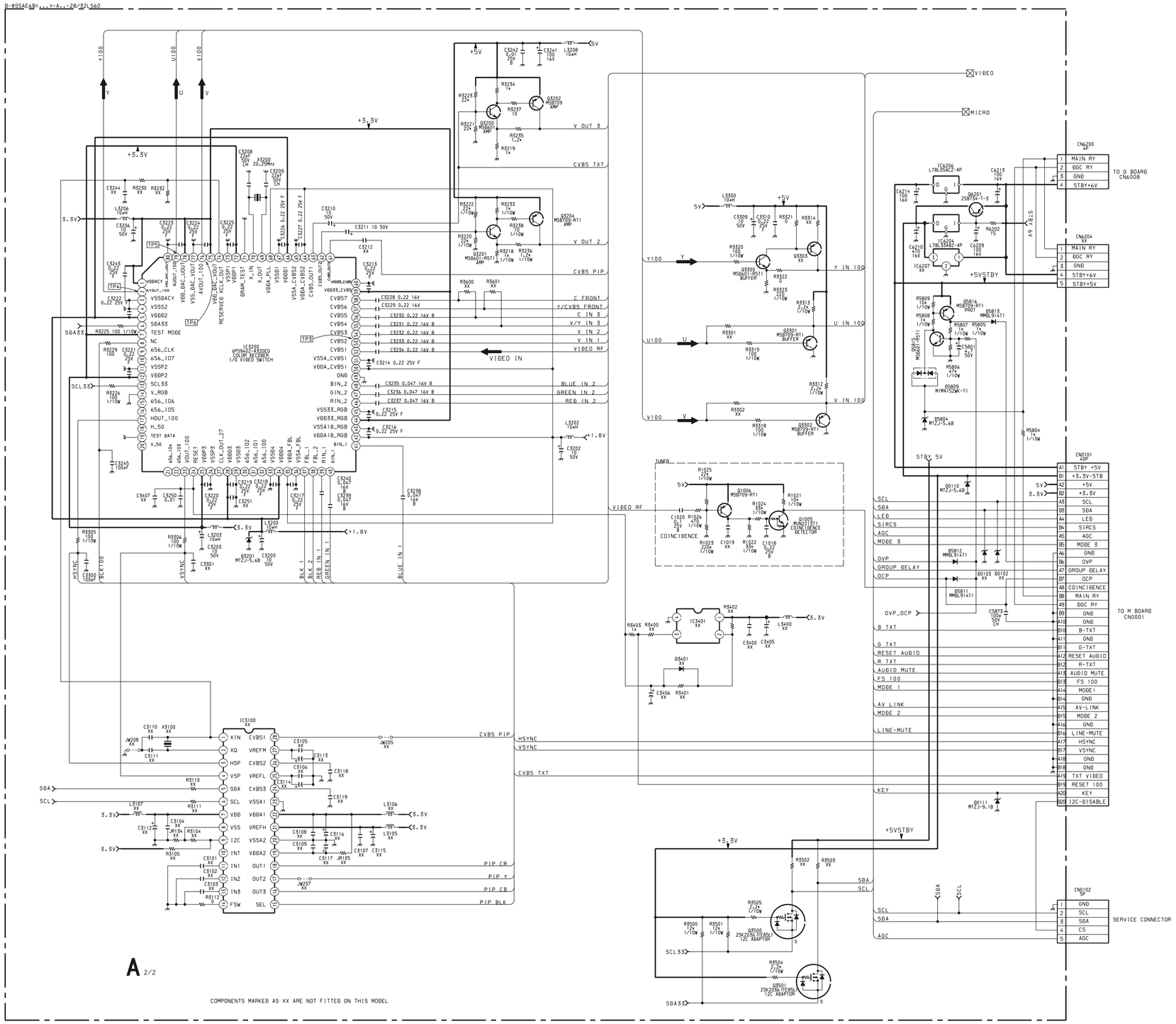
Test Mode 2 is available by rogramming the Remote Commander for operation in Service Mode [As shown on Page 22] then pressing the 'VIDEO' button twice, OSD 'TT' appears. The functions described below are available by selecting the two numbers. To release the 'Test mode 2', press 00, 10, 20 ... twice or switch the TV set into Stand-by mode. In 'TT Menu' mode, it is possible to remove the Menu from the screen by pressing the Speaker Off button once. Pressing the Speaker OFF button a second time will cause the Menu to reappear. The function is kept even when the menu is not displayed on screen !!.

00	'TT' mode off
01	Picture maximum
02	Picture minimum
03	Set speaker/headphone Volume to 35%
04	Set speaker/headphone Volume to 50%
05	Set speaker/headphone Volume to 65%
06	Set speaker/headphone Volume to 80%
07	Ageing mode
08	Shipping Condition
11	Sub picture adjustment
12	Sub colour adjustment
13	Sub Brightness adjustment
14	Text H Position adjustment
15	Rotation Coil Test
16	Picture level 50%
19	Factory Mode Enable/Disable
21	Destination ADEKR
22	Destination BL
23	Destination ADEKR
24	Destination U
25	Destination ADEKR
26	Destination BL
27	Destination ADEKR
28	Destination ADEKR
31	Auto Shutoff Enable/Disable
36	Velocity Modulation (VM) OFF/ON test
41	Re-initialise NVM
43	Select Dual A sound
44	Select Dual B sound
45	Select Mono sound
46	Select Stereo sound
48	Set NVM as non virgin
49	Set NVM as virgin
53	FM Overmodulation Enable/Disable
55	Tuner selection (SONY/ALPS)
59	Select Model 3 Scarts + PIP or 2 Scarts
68	Enable/Disable X26 countermeasure (N problem)
73	Enable Zweiton D/K2 system (6.5/6.74)
74	Enable Zweiton D/K3 system (6.5/5.74)
78	Balance full right
79	Balance full left
87	Local keys test
99	Display Error and Working Time menu

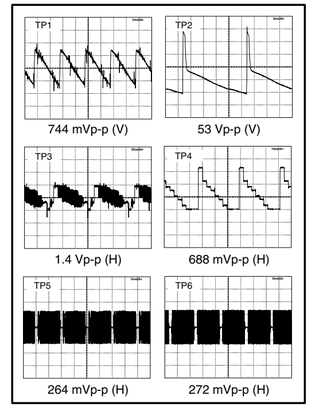
A VIDEO & AUDIO PROCESSORS, AUDIO OUTPUT, VERTICAL DEFLECTION

COMPONENTS MARKED AS XX ARE NOT FITTED ON THIS MODEL

~ A Schematic [Video & Audio Processors, Audio Output, Vertical Deflection] page 1/2~



~ A Board Waveforms ~

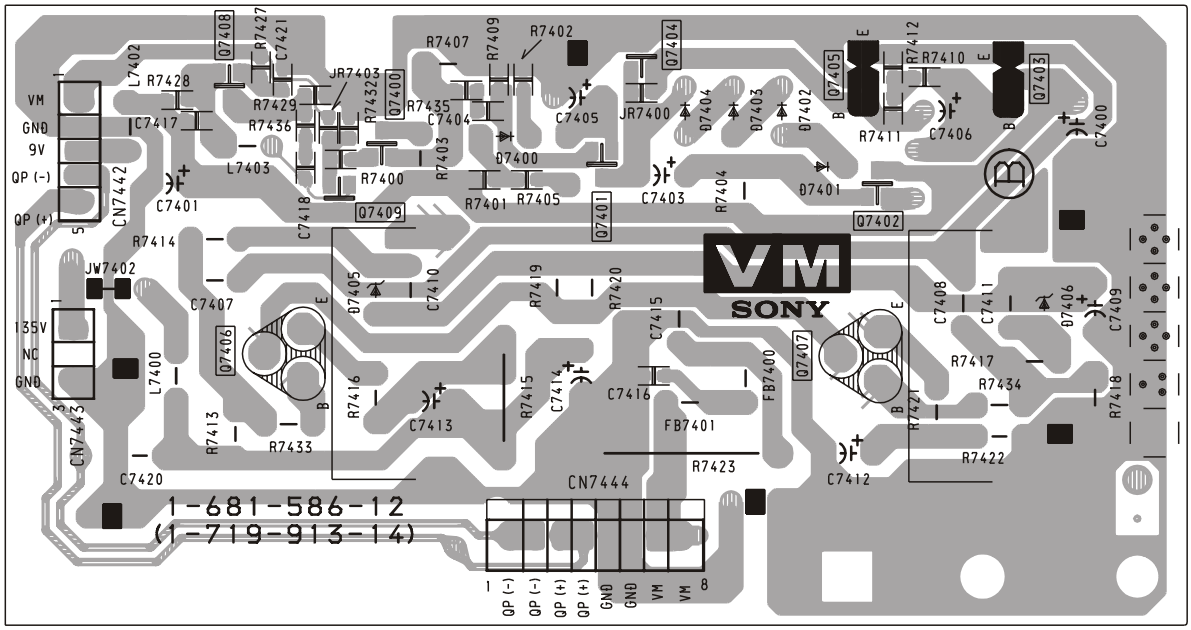


~ A Board Difference Table ~

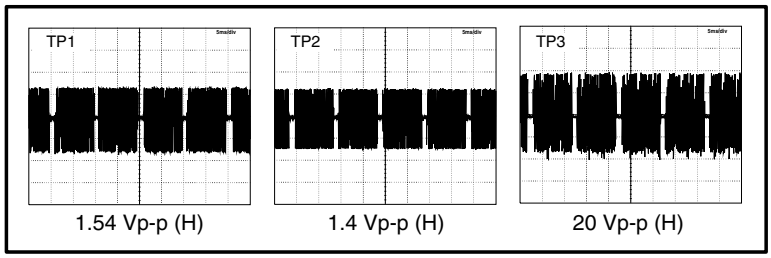
Ref	28LS60B	28LS60E	28LS60U	32LS60B	32LS60E	32LS60K	32LS60U
C1011	120PF 5% 50V	–	–	120PF 5% 50V	–	–	–
C1012	56PF 5% 50V	–	–	56PF 5% 50V	–	–	–
C1016	10PF 0.50PF 50V	–	–	10PF 0.50PF 50V	–	–	–
C1017	68PF 5% 50V	–	–	68PF 5% 50V	–	–	–
L1004	18UH	–	–	18UH	–	–	–
Q1002	MSD601-RST1	–	–	MSD601-RST1	–	–	–
Q1003	DTC114EK	–	–	DTC114EK	–	–	–
R1011	330 5% 1/10W	–	–	330 5% 1/10W	–	–	–
R1012	330 5% 1/10W	–	–	330 5% 1/10W	–	–	–
R1014	–	SHORT 0	SHORT 0	–	SHORT 0	SHORT 0	SHORT 0
R1015	470 5% 1/10W	–	–	470 5% 1/10W	–	–	–
R1016	100 5% 1/10W	–	–	100 5% 1/10W	–	–	–
R1018	2.2K 5% 1/10W	–	–	2.2K 5% 1/10W	–	–	–
R1020	SHORT 0	–	–	SHORT 0	–	–	–
R5303	56K 0.5% 1/10W	56K 0.5% 1/10W	56K 0.5% 1/10W	27K 0.5% 1/10W	27K 0.5% 1/10W	27K 0.5% 1/10W	27K 0.5% 1/10W
R5306	6.8K 0.5% 1/10W	6.8K 0.5% 1/10W	6.8K 0.5% 1/10W	7.5K 0.5% 1/10W	7.5K 0.5% 1/10W	7.5K 0.5% 1/10W	7.5K 0.5% 1/10W
R5327	82 5% 3W	82 5% 3W	82 5% 3W	39 5% 3W	39 5% 3W	39 5% 3W	39 5% 3W
R5338	1K 5% 1/4W	1K 5% 1/4W	1K 5% 1/4W	470 5% 1/4W	470 5% 1/4W	470 5% 1/4W	470 5% 1/4W
R5400	180K 5% 1/10W	180K 5% 1/10W	180K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W
R5407	560K 5% 1/10W	560K 5% 1/10W	560K 5% 1/10W	1M 5% 1/10W	1M 5% 1/10W	1M 5% 1/10W	1M 5% 1/10W
R5878	820 5% 1/10W	820 5% 1/10W	820 5% 1/10W	1K 5% 1/10W	1K 5% 1/10W	1K 5% 1/10W	1K 5% 1/10W
R5883	2.2M 5% 1/10W	2.2M 5% 1/10W	2.2M 5% 1/10W	680K 5% 1/10W	680K 5% 1/10W	680K 5% 1/10W	680K 5% 1/10W
TU1000	BTF-EF411	BTF-EC411	BTF-EU611	BTF-EF411	BTF-EC411	BTF-EC411	BTF-EU611

~ A Schematic [Video & Audio Processors, Audio Output, Vertical Deflection] page 2/2~

~ VM Printed Wiring Board Conductor side ~



~ VM Board Waveforms ~



~ VM Board Voltage Table ~

Ref	(e)(s)	(b)(g)	(c)(d)
Q7400	5.0	5.7	8.7
Q7401	0.9	1.5	4.1
Q7402	5.5	6.1	8.9
Q7403	5.1	5.5	8.9
Q7404	4.7	4.1	0
Q7405	5.1	4.7	0
Q7406	134	133.8	68
Q7407	1.1	1.4	68
Q7408	6.3	5.6	2.5
Q7409	5.7	6.3	0.9

~ A Board Location Table (A Side) ~

DIODE		D2014	K - 9	D3005	M - 7	D3017	M - 4	D3028	M - 2	D5306	C - 5	D7004	F - 7	IC5301	D - 4	IC6206	H - 3
D0101	M - 7	D2015	K - 9	D3007	M - 7	D3018	N - 3	D3201	J - 2	D5307	C - 6	D5809	K - 8	IC5302	B - 4	IC6207	H - 4
D0104	L - 4	D2018	M - 2	D3008	M - 7	D3019	N - 3	D5103	D - 6	D5400	E - 4	IC		IC5400	G - 4	TRANSISTOR	
D0110	I - 4	D2019	M - 2	D3009	N - 7	D3021	M - 4	D5104	E - 5	D5404	F - 3	IC5104	D - 6	IC6201	G - 10	Q5202	E - 2
D0111	H - 2	D2502	H - 9	D3011	M - 4	D3023	M - 4	D5200	D - 2	D5405	F - 3	IC5200	B - 3	IC6202	I - 6	Q5301	C - 5
D0112	M - 4	D3001	M - 7	D3013	M - 4	D3024	M - 4	D5201	E - 2	D5807	F - 7	IC5201	C - 4	IC6203	J - 6	Q5306	E - 4
D0113	M - 5	D3003	M - 7	D3015	M - 4	D3026	M - 2	D5305	D - 6	D6200	J - 6	IC5300	E - 4	IC6205	D - 5	Q5404	F - 4
D1006	M - 10																

~ A Board Location Table (B Side) ~

DIODE		D2503	G - 9	D3024	B - 3	D5309	J - 3	IC5103	L - 3	TRANSISTOR		Q3201	C - 2	Q5300	M - 4	Q7003	H - 6
D0101	B - 7	D3001	B - 7	D3026	B - 2	D5400	K - 4	IC5104	K - 6	Q1000	C - 6	Q3202	C - 3	Q5301	L - 5	Q7009	K - 6
D0104	C - 5	D3003	B - 7	D3028	C - 2	D5401	J - 4	IC5200	M - 3	Q1001	D - 6	Q3204	C - 3	Q5302	K - 7	Q7011	J - 6
D0110	G - 4	D3005	B - 7	D3201	F - 2	D5404	J - 3	IC5201	L - 4	Q1004	D - 10	Q3300	F - 3	Q5303	M - 4	Q7012	J - 5
D0111	G - 2	D3007	B - 6	D5103	L - 6	D5405	I - 3	IC5300	J - 3	Q1005	B - 2	Q3301	F - 3	Q5304	M - 5	Q7013	J - 6
D0112	C - 5	D3008	B - 6	D5104	J - 5	D5809	K - 8	IC5301	K - 4	Q1006	B - 3	Q3302	F - 3	Q5305	K - 3	Q7014	J - 6
D0113	C - 5	D3009	B - 6	D5200	K - 2	D5811	L - 8	IC5302	M - 4	Q2000	C - 9	Q3500	F - 3	Q5306	K - 4	Q7015	I - 5
D1006	B - 10	D3011	C - 4	D5202	L - 4	D5812	L - 8	IC5400	I - 3	Q2002	D - 9	Q3501	F - 3	Q5400	J - 4	Q7016	I - 5
D2014	C - 9	D3013	C - 4	D5300	L - 5	D6200	F - 7	IC6200	I - 9	Q2003	D - 9	Q5101	M - 5	Q5401	K - 4	Q7017	I - 6
D2015	D - 9	D3015	C - 4	D5303	N - 4	IC		IC6201	I - 8	Q2004	E - 7	Q5200	M - 4	Q5402	J - 5	Q7018	I - 5
D2016	E - 8	D3017	B - 4	D5304	M - 4	IC2000	C - 8	IC6202	F - 6	Q2005	E - 7	Q5201	N - 3	Q5403	J - 4	Q7019	I - 5
D2018	B - 2	D3018	B - 3	D5305	L - 6	IC2001	D - 9	IC6203	E - 6	Q2501	G - 8	Q5202	K - 3	Q5404	J - 4		
D2019	B - 2	D3019	B - 3	D5306	L - 5	IC2500	F - 8	IC6205	K - 5	Q2502	G - 9	Q5203	J - 2	Q5813	J - 8		
D2500	G - 9	D3021	C - 4	D5307	L - 7	IC3100	E - 5	IC6206	G - 3	Q2503	G - 9	Q5204	L - 4	Q5815	L - 8		
D2502	G - 9	D3023	B - 3	D5308	M - 4	IC3200	E - 3	IC6207	G - 4	Q3200	C - 3	Q5205	M - 3	Q5816	L - 8		

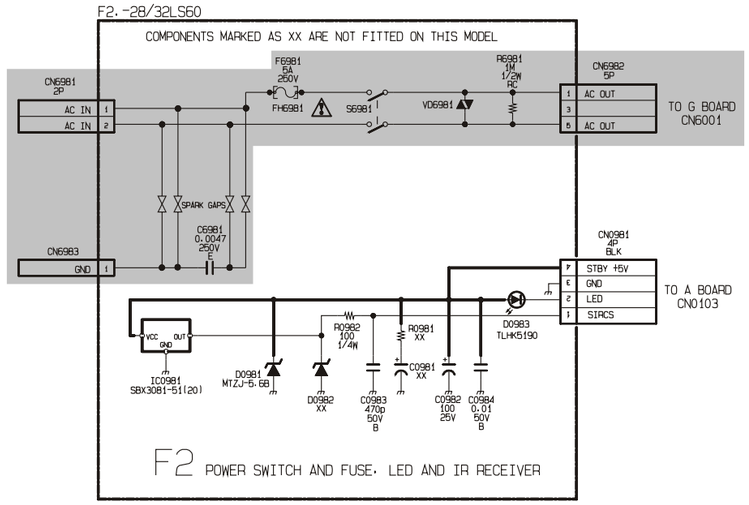
~ A Board Semiconductor Voltage Table ~

Ref	(s)	(g)	(d)	Ref	(e)	(b)	(c)	Ref	(e)	(b)	(c)	Ref	(e)	(b)	(c)	Ref	(e)	(b)	(c)	Ref	(e)	(b)	(c)
Q3500	2.7	3.3	3.9	Q2002	0	0	4	Q3204	5	4.4	3.4	Q5205	1.9	1.2	0	Q5813	0	7.9	0	Q7015	11.6	10.9	8.8
Q3501	2.7	3.3	4	Q2003	0	0	4	Q3300	0.7	1.3	5	Q5300	0	0.4	2.2	Q5814	0	0	0	Q7016	6	6.6	10.9
Q5301	0	5.1	51.2	Q2004	3.3	3.9	8.3	Q3301	1.9	1.2	0	Q5301	5.1	0	51.2	Q5815	0	0	5	Q7017	2.7	2	0
Q5404	0	0	0.5	Q2005	3.3	3.9	8.3	Q3302	1.9	1.2	0	Q5302	8.9	5.7	0	Q5816	5	5	0	Q7018	11.6	10.9	8.6
Ref	**(e)**	**(b)**	**(c)**	Q2501	0	0	15.2	Q3500	3.3	2.7	3.9	Q5304	0	0.4	5.6	Q7003	5.6	6.2	8.8	Q7019	6	6.6	10.9
Q1001	3.2	3.9	8.3	Q2502	0	0.7	0	Q3501	3.3	2.7	4	Q3400	0	0	0.1	Q7009	3.2	7	0.1	Q7020	8.9	8.9	0
Q1004	1.9	1.3	0	Q2503	0.6	0.6	0.5	Q5101	0	0.4	6.4	Q5401	0	0	7.9	Q7011	2.5	1.9	0	Q7021	2.7	2.7	8.9
Q1005	0	0.5	5	Q3200	1.9	2.5	4.4	Q5201	2.8	3.4	7.9	Q5402	0	0	-11.3	Q7012	11.6	10.9	8.7				
Q1006	5	4.7	1	Q3201	1.9	2.5	4.4	Q5202	0.2	0.8	11.7	Q5403	-13.5	-11.2	-8.3	Q7013	6	6.6	10.9				
Q2000	4.2	4.8	8.3	Q3202	5	4.4	3.4	Q5203	0.2	0.8	11.7	Q5404	0	0	0.5	Q7014	2.5	1.8	0				

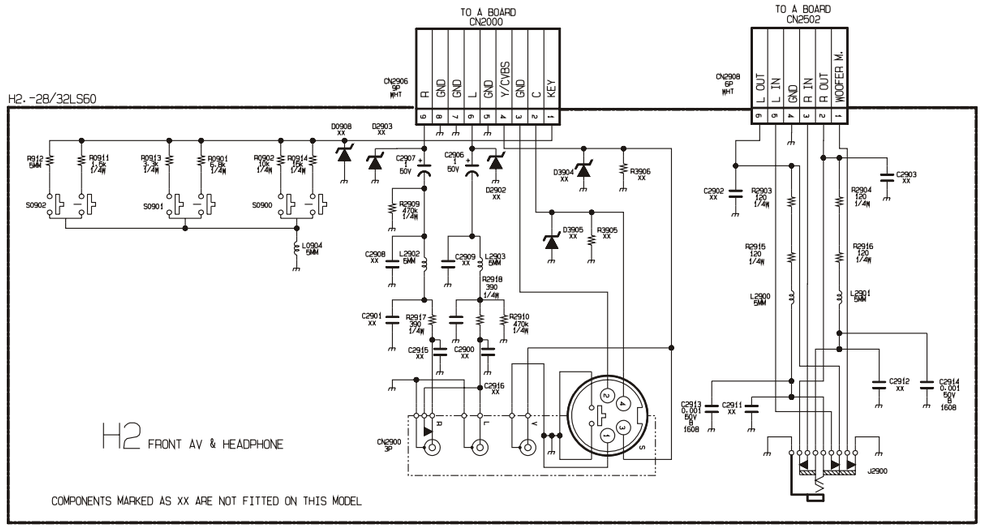
~ A Board IC Voltage Table ~

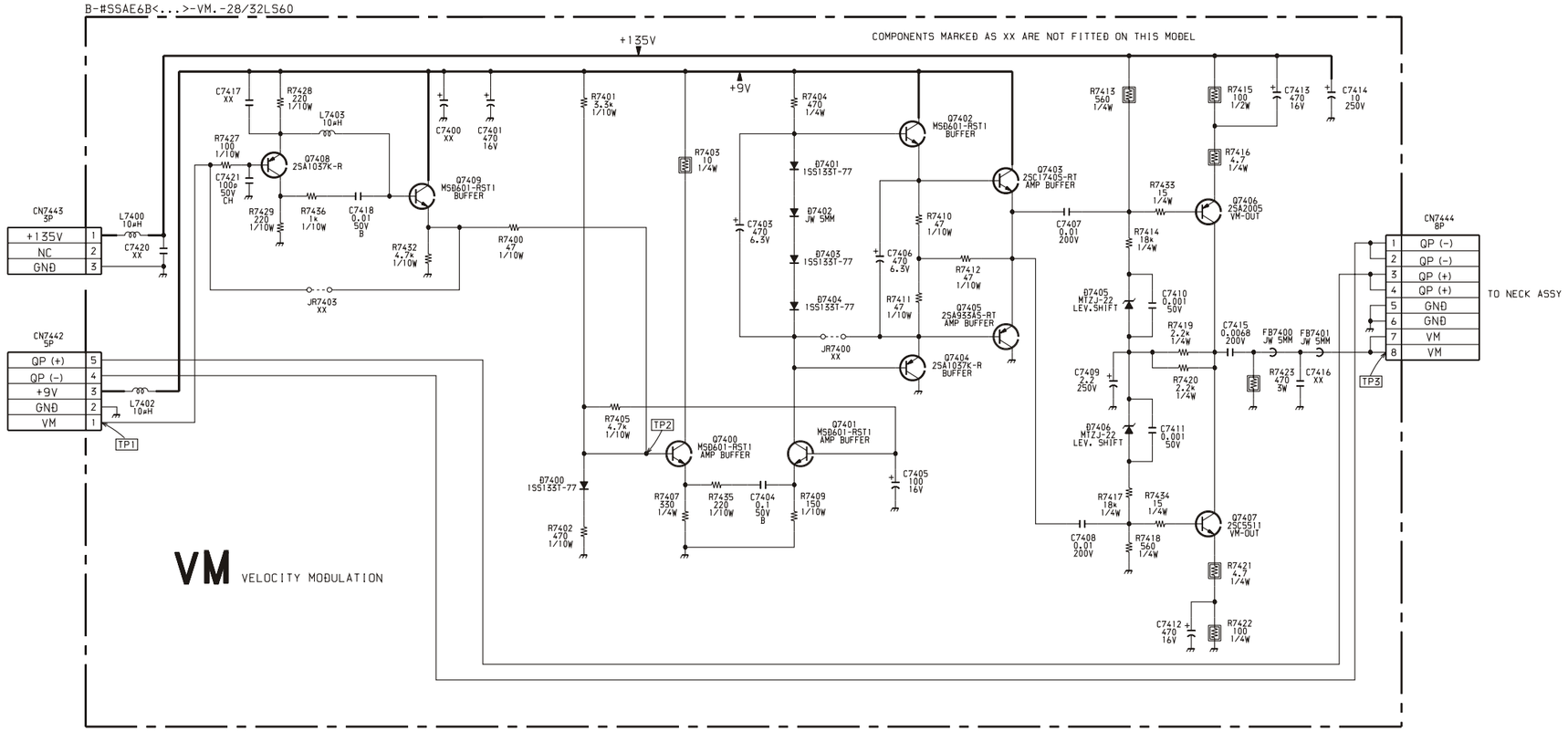
IC Voltage Table														
Ref No	**Pin No**	**Voltage (V)**	Ref No	**Pin No**	**Voltage (V)**	Ref No	**Pin No**	**Voltage (V)**	Ref No	**Pin No**	**Voltage (V)**	Ref No	**Pin No**	**Voltage (V)**
IC3100	1	1.3	IC5103	6	1.8	IC5201	5	9.3	IC5400	6	13.7	IC7002	32	8.9
	2	1.7		7	2		6	0.5		7	1.4		33	0
	3	2.6		8	0		7	12.1	IC7002	1	3.6		34	4.7
	4	0		9	3.1		8	-14.1		2	0		35	4.7
	5	2.5		10	3	IC5300	1	6		3	4.4		36	4.7
	6	3.3		11	5		2	6		4	4.8		37	8.9
	7	0		12	5		3	6		5	3.5		38	0
	8	0		13	5		4	0		6	3.4		39	4.8
	9	1.1		14	0		5	6		7	7.6		40	4.8
	10	1.1		15	0		6	6		8	0		41	4.8
	11	0		16	5		7	6		9	0		42	0
	12	0	IC5200	1	4.8		8	12		10	0.4		43	0
	13	0		2	4.9	IC5301	1	1.7		11	1.8		44	0
	14	0		3	4.8		2	8.5		12	0.4		45	6.3
	15	0.5		4	4.8		3	6.5		13	0.9		46	8.9
	16	0.3		5	5		4	0		14	5		47	8.9
	17	0.3		6	5		5	6.5		15	2.5		48	6
	18	0.3		7	5		6	7.1		16	0		49	2.5
	19	3.3		8	5		7	0.4		17	3		50	4.1
	20	0		9	4.9		8	12		18	2.7		51	0
	21	3.3		10	12.1	IC5302	1	0		19	3.9		52	6
	22	3.3		11	4.1		2	5.8		20	0		53	5.8
	23	0		12	5		3	6.3		21	6.1		54	5.8
	24	3.2		13	5		4	0		22	2.7		55	0.4
	25	1.2		14	1.9		5	6.6		23	8.8		56	5.8
	26	3.2		15	1.1		6	6.5		24	0		57	5.8
	27	2.1		16	0		7	0.4		25	4.3		58	5.8
	28	0.3		17	0		8	12		26	3.2		59	0.3
IC5103	1	3.3		18	0	IC5400	1	1.4		27	5.2		60	0
	2	3.3	IC5201	1	9.3		2	13.2		28	0.3		61	0
	3	1.9		2	3.8		3	-12.5		29	4.9		62	2.9
	4	2.6		3	3.8		4	-15.4		30	3.4		63	3.7
	5	2.5		4	-15.4		5	-0.4		31	5.6			

~ F2 Board Schematic Diagram [Power Switch & Fuse. LED & IR Receiver] ~

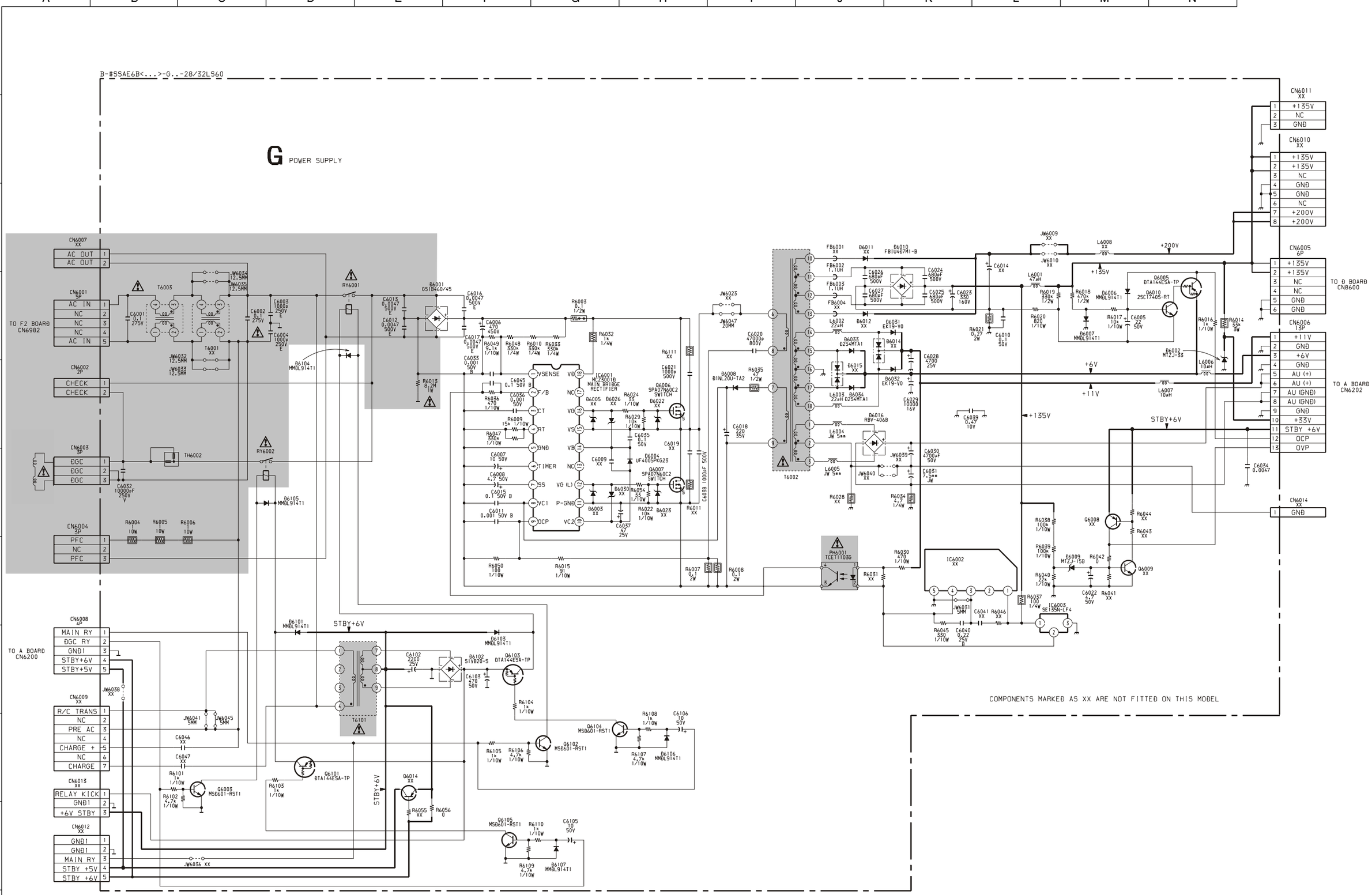


~ H2 Board Schematic Diagram [Front AV & Headphone] ~





~ VM Board Schematic Diagram [Velocity Modulation] ~



~ G Board Schematic Diagram [Power Supply] ~

C..-28/32LS60

C R.G.B OUT

TO A BOARD CN7001

CN7301 9P BLK: R- R+ G- G+ B- B+ GND +12V IK

TP1 TP2 TP3 TP4

IC7300 TDA6111Q/N4 RED-VIDEO-OUT

IC7325 TDA6111Q/N4 GREEN-VIDEO-OUT

IC7350 TDA6111Q/N4 BLUE-VIDEO-OUT

FV FOCUS

external RV7375 110K

J7375

D7379 MTZJ-5.6B

D7378 MTZJ-5.6B

TP5 TP6 TP7

L7376

CN7333 TAB (CONTACT) TO FBT

CN7300 5P: +200V NC GND NC HEATER — TO D BOARD CN8614

CN7311 TAB (CONTACT) — TO COATING EARTH

+12V +200V

L7375 47uH

L7378 10uH

D7300 1SS119-25T D7305 1SS119-25T D7350 1SS119-25T

Q7355 MUN221311 Q7352 MUN221311 Q7353 MUN221311 Q7354 MUN211311 Q7350 MUN211311

D7377 XX D7327 XX D7353 XX

KV-28LS60 - W66LLX060X
KV-32LS60 - W76LLX060X

V901 PICTURE TUBE

KG KB G2 H CV KR G1 G4 HV

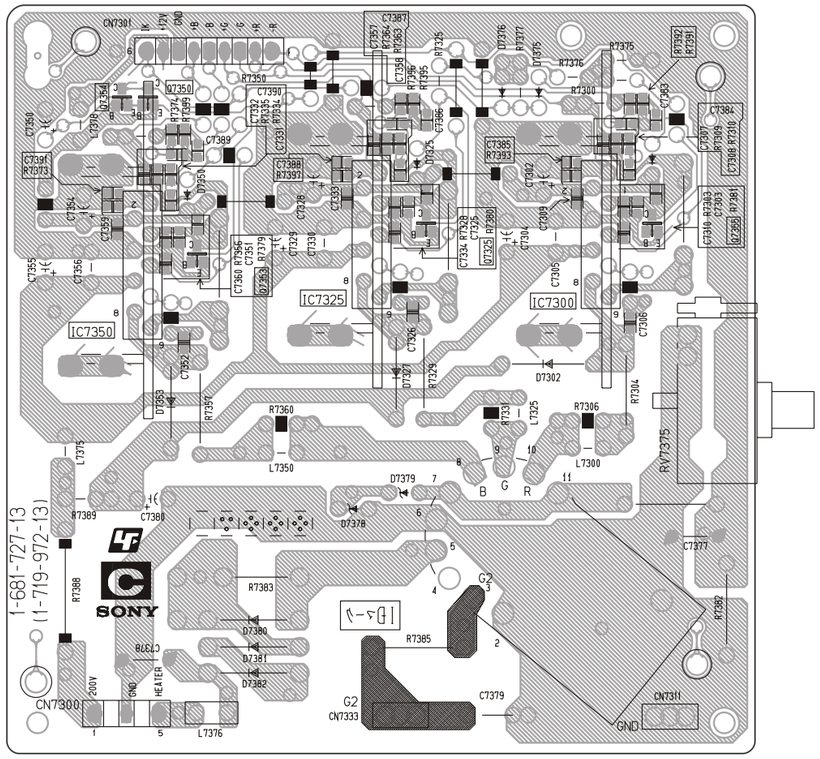
TO D BOARD HV (T8800)

TO COATING EARTH

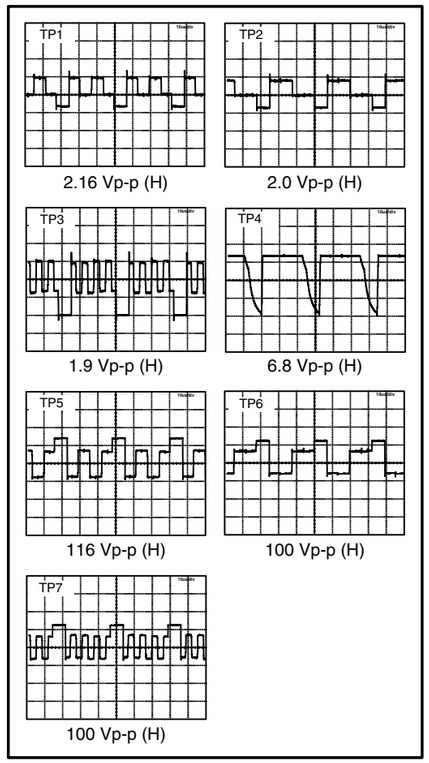
COMPONENTS MARKED AS XX ARE NOT FITTED ON THIS MODEL

~ C Board Schematic Diagram [R-G-B Out] ~

~ C Printed Wiring Board Conductor side ~



~ C Board Waveforms ~



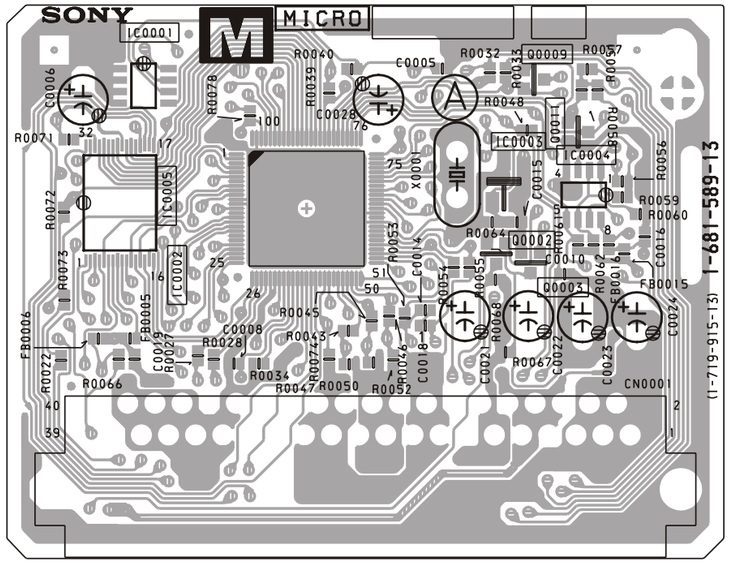
~ C Board Semiconductor Voltage Table ~

Ref	(e)	(b)	(c)
Q7350	12	11.98	0
Q7352	0	0	3.8
Q7353	0	0	3.8
Q7354	11.98	12	0
Q7355	0	0	3.8

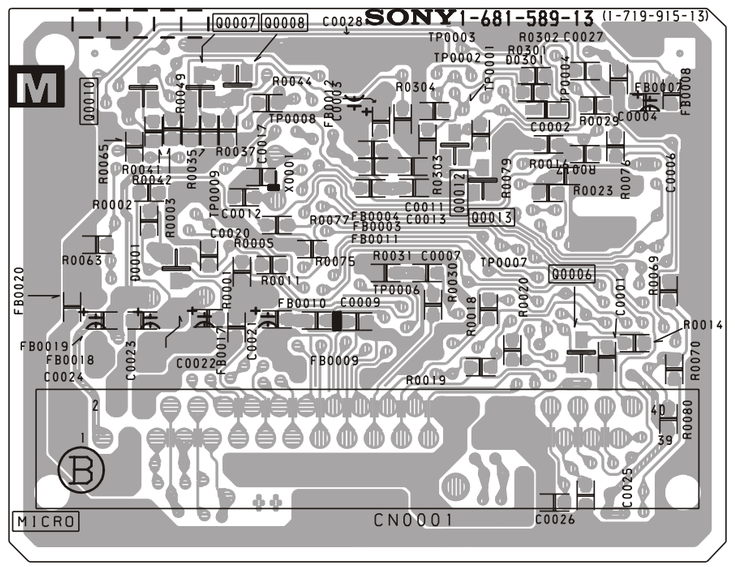
~ C Board IC Voltage Table ~

IC Voltage Table		
Ref No	Pin No	Voltage (V)
IC7300	1	3.9
	3	3.8
	5	7.5
	6	200
	7	140
	8	153
	9	140
IC7325	1	3.9
	3	3.8
	5	7.7
	6	200
	7	140
	8	153
	9	140
IC7350	1	3.9
	3	3.8
	5	7.5
	6	200
	7	139
	8	148
	9	138

~ M Printed Wiring Board Conductor side A ~



~ M Printed Wiring Board Conductor side B ~



B-#SSAE6B<...>-M..-28/32LS60

M MICRO PROCESSOR

COMPONENTS MARKED AS XX ARE NOT FITTED ON THIS MODEL

CN0001 40P

+5V-STB	A1
+3.3V-STB	B1
+5V	A2
+3.3V	B2
SCL	A3
SDA	B3
LED	A4
SIRCS	B4
AGC	A5
MODE 3	B5
GND	A6
OVP	B6
GROUP DELAY	A7
OCP	B7
COINCIDENCE	A8
MAIN RY	B8
DGC RY	A9
GND	B9
GND	A10
B-TXT	B10
GND	A11
G-TXT	B11
RESET AUDIO	A12
R-TXT	B12
AUDIO MUTE	A13
FS 100	B13
MODE1	A14
GND	B14
AV-LINK	A15
MODE2	B15
GND	A16
LINE-MUTE	B14
HSYNC	A17
VSYNC	B17
GND	A18
GND	B18
TXT VIDEO	A19
RESET 100	B19
KEY	A20
I2C-DISABLE	B20

TO A BOARD CN0101

IC0002 SAA5667HL/MI/0560 MICRO CONTROLLER

IC0001 M24C16-MN6T NVM MEMORY

IC0003 PST573IMT RESET CIRCUIT

IC0004 LM393DT COMPARATOR

IC0005 K6T1008V2A SRAM

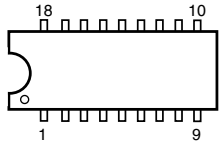
~ D Board Schematic Diagram [Deflection] ~

~ D Board Difference Table ~

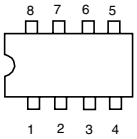
Ref	28LS60B	28LS60E	28LS60U	32LS60B	32LS60E	32LS60K	32LS60U
C8107	-	-	-	27K 0.5% 1/10W	27K 0.5% 1/10W	27K 0.5% 1/10W	27K 0.5% 1/10W
C8130	220PF 5% 50V	220PF 5% 50V	220PF 5% 50V	_	_	_	_
C8207	_	_	_	0.047UF 10% 16V	0.047UF 10% 16V	0.047UF 10% 16V	0.047UF 10% 16V
C8208	_	_	_	0.01UF 10% 25V	0.01UF 10% 25V	0.01UF 10% 25V	0.01UF 10% 25V
C8814	7500PF 3% 1.2KV	7500PF 3% 1.2KV	7500PF 3% 1.2KV	6800PF 3% 1.2KV	6800PF 3% 1.2KV	6800PF 3% 1.2KV	6800PF 3% 1.2KV
C8815	6800PF 3% 1.5KV	6800PF 3% 1.5KV	6800PF 3% 1.5KV	6200PF 3% 1.5KV	6200PF 3% 1.5KV	6200PF 3% 1.5KV	6200PF 3% 1.5KV
C8825	0.22UF 5% 250V	0.22UF 5% 250V	0.22UF 5% 250V	0.18UF 5% 250V	0.18UF 5% 250V	0.18UF 5% 250V	0.18UF 5% 250V
C8826	0.68UF 5% 250V	0.68UF 5% 250V	0.68UF 5% 250V	0.56UF 5% 250V	0.56UF 5% 250V	0.56UF 5% 250V	0.56UF 5% 250V
R8127	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	6.8K 0.5% 1/10W	6.8K 0.5% 1/10W	6.8K 0.5% 1/10W	6.8K 0.5% 1/10W
R8141	22K 0.5% 1/10W	22K 0.5% 1/10W	22K 0.5% 1/10W	33K 0.5% 1/10W	33K 0.5% 1/10W	33K 0.5% 1/10W	33K 0.5% 1/10W
R8142	7.5K 0.5% 1/10W	7.5K 0.5% 1/10W	7.5K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W
R8144	220K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	120K 5% 1/10W	120K 5% 1/10W	120K 5% 1/10W	120K 5% 1/10W
R8149	22K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	3.9K 5% 1/10W	3.9K 5% 1/10W	3.9K 5% 1/10W	3.9K 5% 1/10W
R8150	22K 5% 1/10W	22K 5% 1/10W	22K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W
R8154	5.6K 5% 1/10W	5.6K 5% 1/10W	5.6K 5% 1/10W	3.3K 5% 1/10W	3.3K 5% 1/10W	3.3K 5% 1/10W	3.3K 5% 1/10W
R8155	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	2.7K 5% 1/10W	2.7K 5% 1/10W	2.7K 5% 1/10W	2.7K 5% 1/10W
R8158	2.2K 0.5% 1/10W	2.2K 0.5% 1/10W	2.2K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W	4.7K 0.5% 1/10W
R8159	2.2K 0.5% 1/10W	2.2K 0.5% 1/10W	2.2K 0.5% 1/10W	SHORT 0	SHORT 0	SHORT 0	SHORT 0
R8161	6.8K 0.5% 1/10W	6.8K 0.5% 1/10W	6.8K 0.5% 1/10W	8.2K 0.5% 1/10W	8.2K 0.5% 1/10W	8.2K 0.5% 1/10W	8.2K 0.5% 1/10W
R8175	4.7K 5% 1/10W	4.7K 5% 1/10W	4.7K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W
R8176	SHORT 0	SHORT 0	SHORT 0	10K 5% 1/10W	10K 5% 1/10W	10K 5% 1/10W	10K 5% 1/10W
R8177	5.6K 5% 1/10W	5.6K 5% 1/10W	5.6K 5% 1/10W	4.7K 5% 1/10W	4.7K 5% 1/10W	4.7K 5% 1/10W	4.7K 5% 1/10W
R8179	4.7K 5% 1/10W	4.7K 5% 1/10W	4.7K 5% 1/10W	SHORT 0	SHORT 0	SHORT 0	SHORT 0
R8186	2.7K 5% 1/10W	2.7K 5% 1/10W	2.7K 5% 1/10W	3.9K 5% 1/10W	3.9K 5% 1/10W	3.9K 5% 1/10W	3.9K 5% 1/10W
R8189	1.5K 5% 1/10W	1.5K 5% 1/10W	1.5K 5% 1/10W	560 5% 1/10W	560 5% 1/10W	560 5% 1/10W	560 5% 1/10W
R8203	6.8K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W	SHORT 0	SHORT 0	SHORT 0	SHORT 0
R8206	470K 5% 1/10W	470K 5% 1/10W	470K 5% 1/10W	330K 0.5% 1/10W	330K 0.5% 1/10W	330K 0.5% 1/10W	330K 0.5% 1/10W
R8207	270K 5% 1/10W	270K 5% 1/10W	270K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W
R8215	22K 0.5% 1/10W	22K 0.5% 1/10W	22K 0.5% 1/10W	47K 0.5% 1/10W	47K 0.5% 1/10W	47K 0.5% 1/10W	47K 0.5% 1/10W
R8216	47K 5% 1/10W	47K 5% 1/10W	47K 5% 1/10W	47K 0.5% 1/10W	47K 0.5% 1/10W	47K 0.5% 1/10W	47K 0.5% 1/10W
R8220	6.8K 5% 1/10W	6.8K 5% 1/10W	6.8K 5% 1/10W	12K 5% 1/10W	12K 5% 1/10W	12K 5% 1/10W	12K 5% 1/10W
R8221	18K 5% 1/10W	18K 5% 1/10W	18K 5% 1/10W	22K 5% 1/10W	22K 5% 1/10W	22K 5% 1/10W	22K 5% 1/10W
R8224	_	_	_	3.3K 5% 1/10W	3.3K 5% 1/10W	3.3K 5% 1/10W	3.3K 5% 1/10W
R8810	4.7K 5% 2W	4.7K 5% 2W	4.7K 5% 2W	3.9K 5% 2W	3.9K 5% 2W	3.9K 5% 2W	3.9K 5% 2W
R8836	18K 5% 1/4W	18K 5% 1/4W	18K 5% 1/4W	15K 5% 1/4W	15K 5% 1/4W	15K 5% 1/4W	15K 5% 1/4W
R8856	8.2K 5% 3W	8.2K 5% 3W	8.2K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W
R8857	8.2K 5% 3W	8.2K 5% 3W	8.2K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W
R8858	8.2K 5% 3W	8.2K 5% 3W	8.2K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W
R8859	8.2K 5% 3W	8.2K 5% 3W	8.2K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W	6.8K 5% 3W
R8886	220K 0.5% 1/10W	220K 0.5% 1/10W	220K 0.5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W	220K 5% 1/10W
R8897	470K 1% 1/4W	470K 1% 1/4W	470K 1% 1/4W	680K 1% 1/4W	680K 1% 1/4W	680K 1% 1/4W	680K 1% 1/4W
T8800	FBT ASSY NX4522//Z214	FBT ASSY NX4522//Z214	FBT ASSY NX4522//Z214	FBT ASSY NX4522//Z2B4	FBT ASSY NX4522//Z2B4	FBT ASSY NX4522//Z2B4	FBT ASSY NX4522//Z2B4

5-4. SEMICONDUCTORS

CXAB070AP
MCZ3001D



LM318P
LM358N
LM393DT
LM393N
M24C16-MN6T(A)



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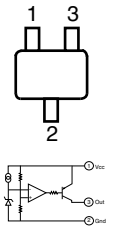

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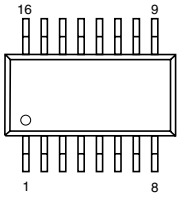

(TOP VIEW)

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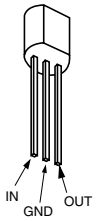

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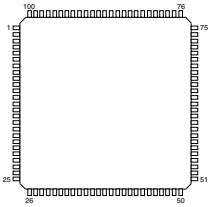

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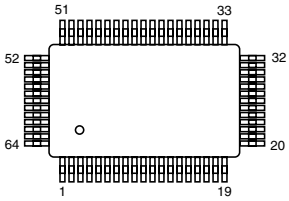

(TOP VIEW)

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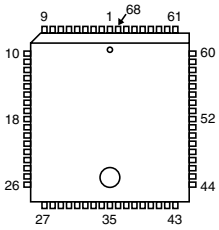

(TOP VIEW)

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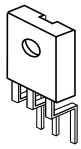

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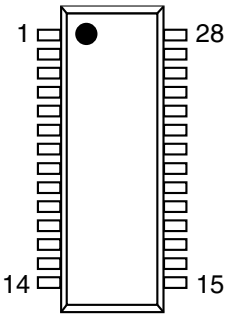

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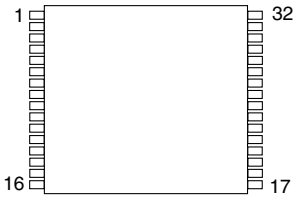

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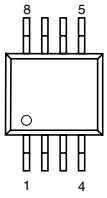

(TOP VIEW)

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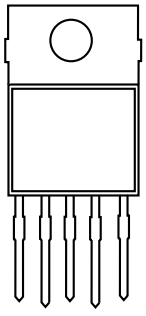

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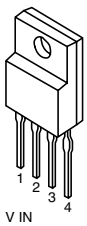
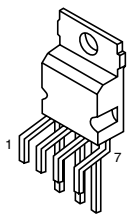


1 : V IN
2 : V OUT
3 : GND
4 : ON/OFF CONTROL

STV9379



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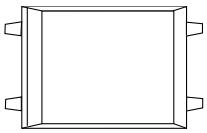

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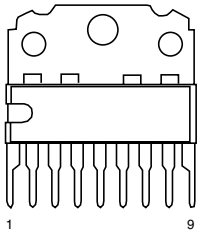

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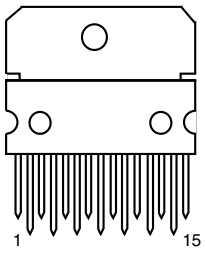

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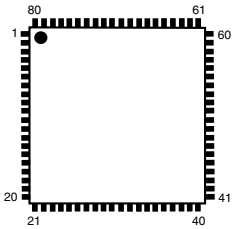

(TOP VIEW)

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IRF620
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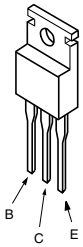
2SC5511



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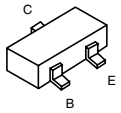

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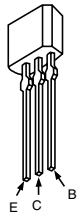

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STP5NB40(030Y)
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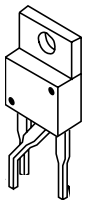

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UN213
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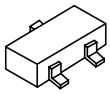

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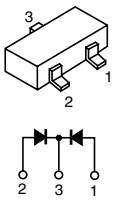

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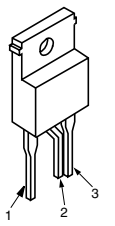

1 V OUT SENSE
2 COLLECTOR
3 GND

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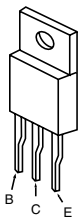

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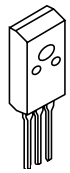

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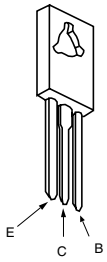

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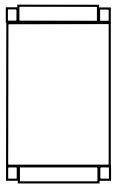

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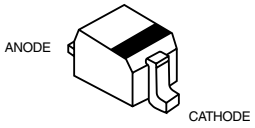

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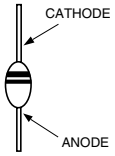

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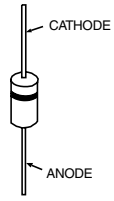

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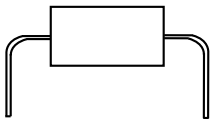

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MTZJ-33B
MTZJ-3.6A
MTZJ-4.7C
MTZJ-T-77-22
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RD39ES-B2
RD5.6ESB2
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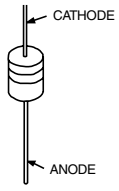

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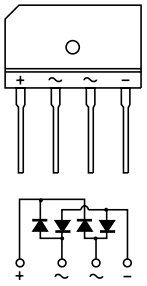

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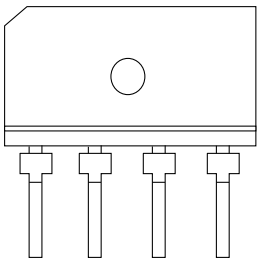

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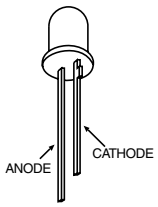
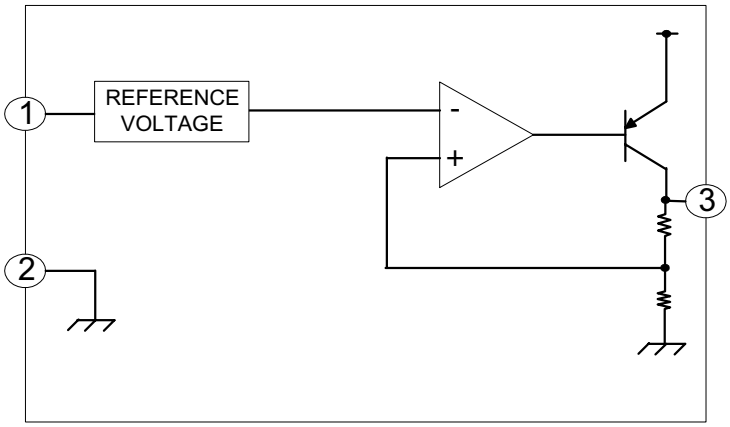
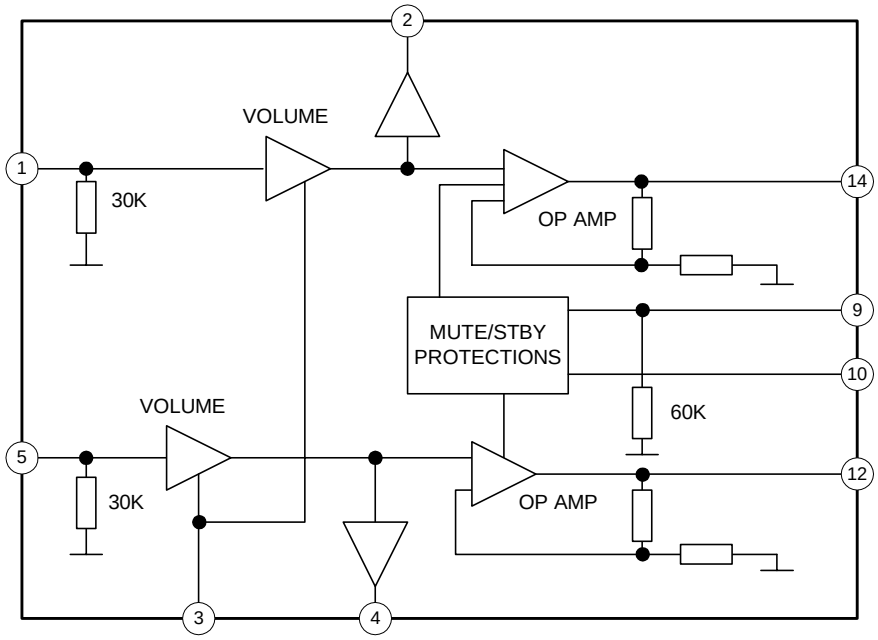


5-5 IC BLOCK DIAGRAMS

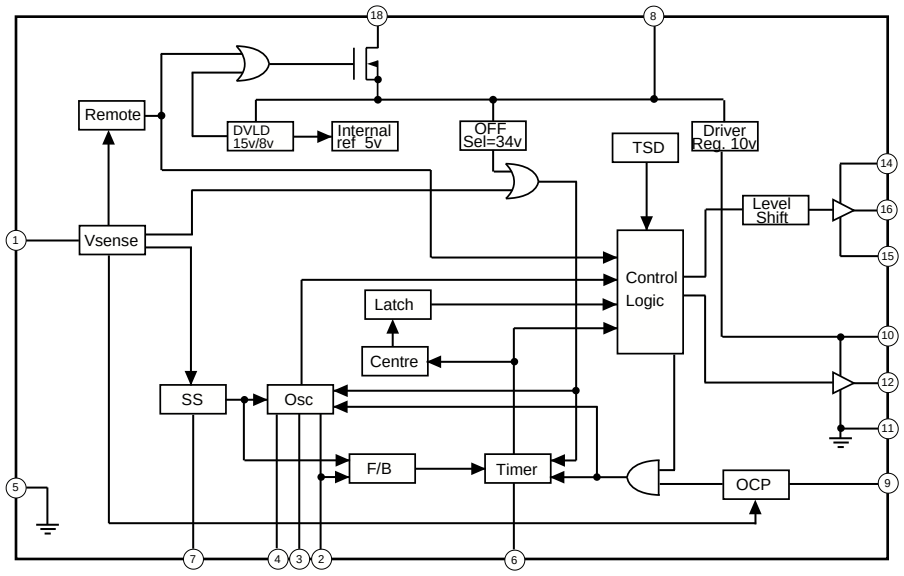
A BOARD IC6202/IC6205 BA033T/BA12T



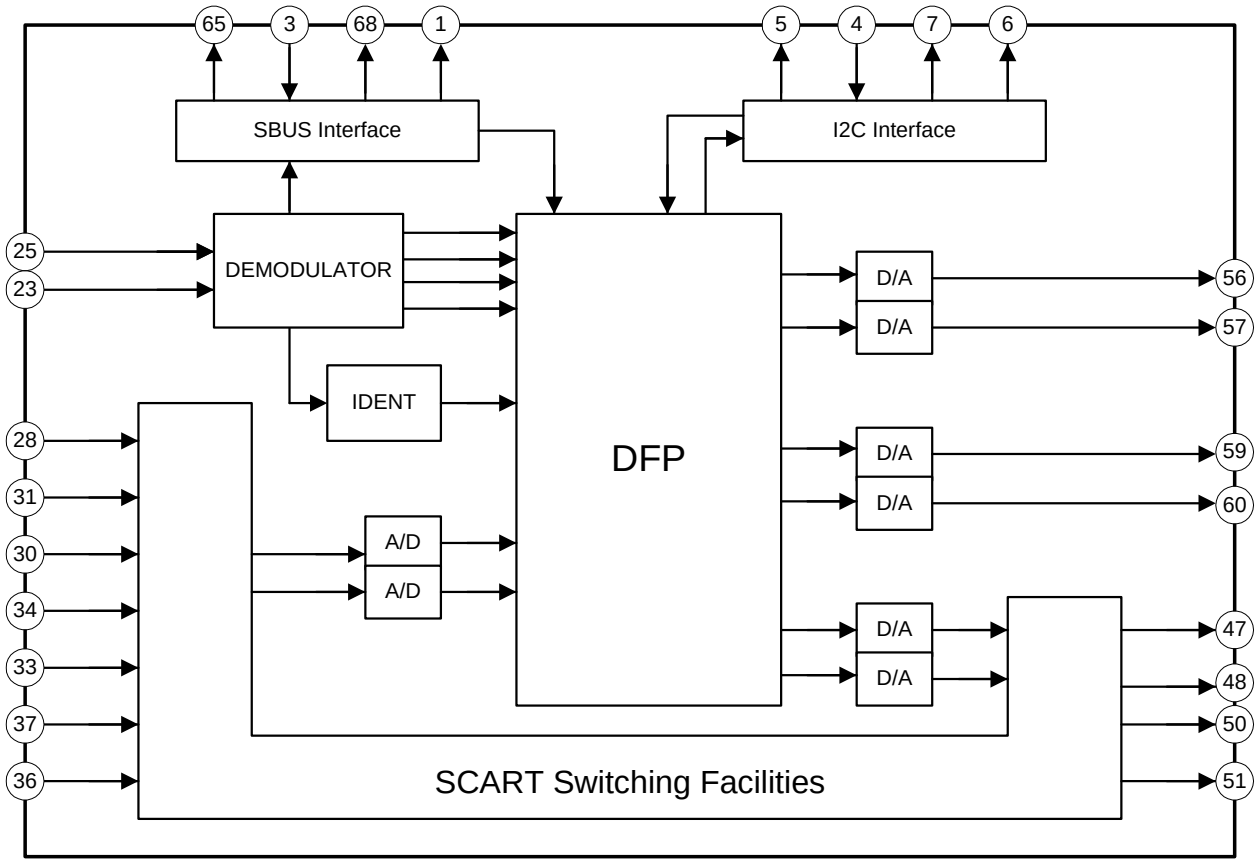
A BOARD IC2500 TDA7497



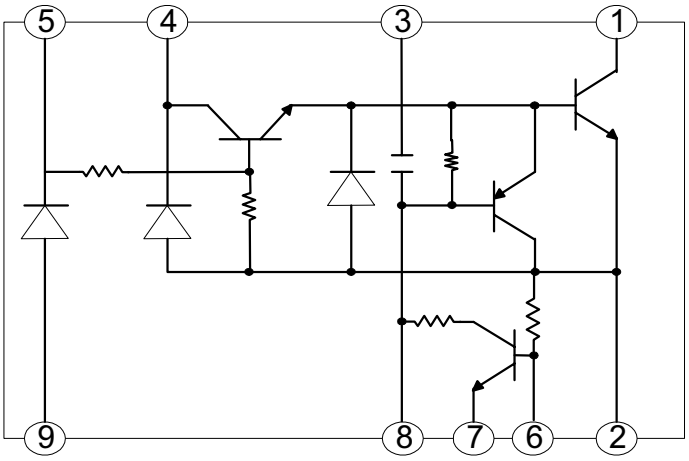
G BOARD IC6001 MCZ3001D



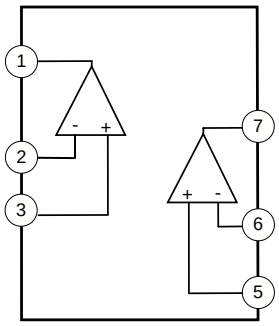
A BOARD IC2000 MSP3411G



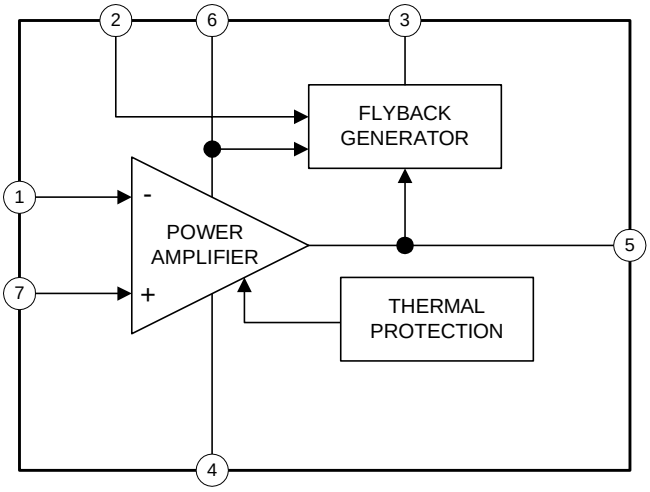
G BOARD IC6003 SE135N-LF4



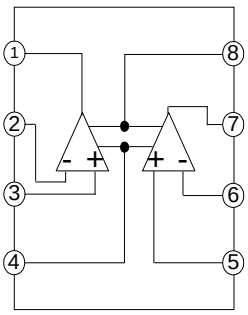
A BOARD IC5301/IC5302 LM393N



A BOARD IC5400 STV9379



A BOARD IC5300 LM358N



SECTION 6
EXPLODED VIEWS

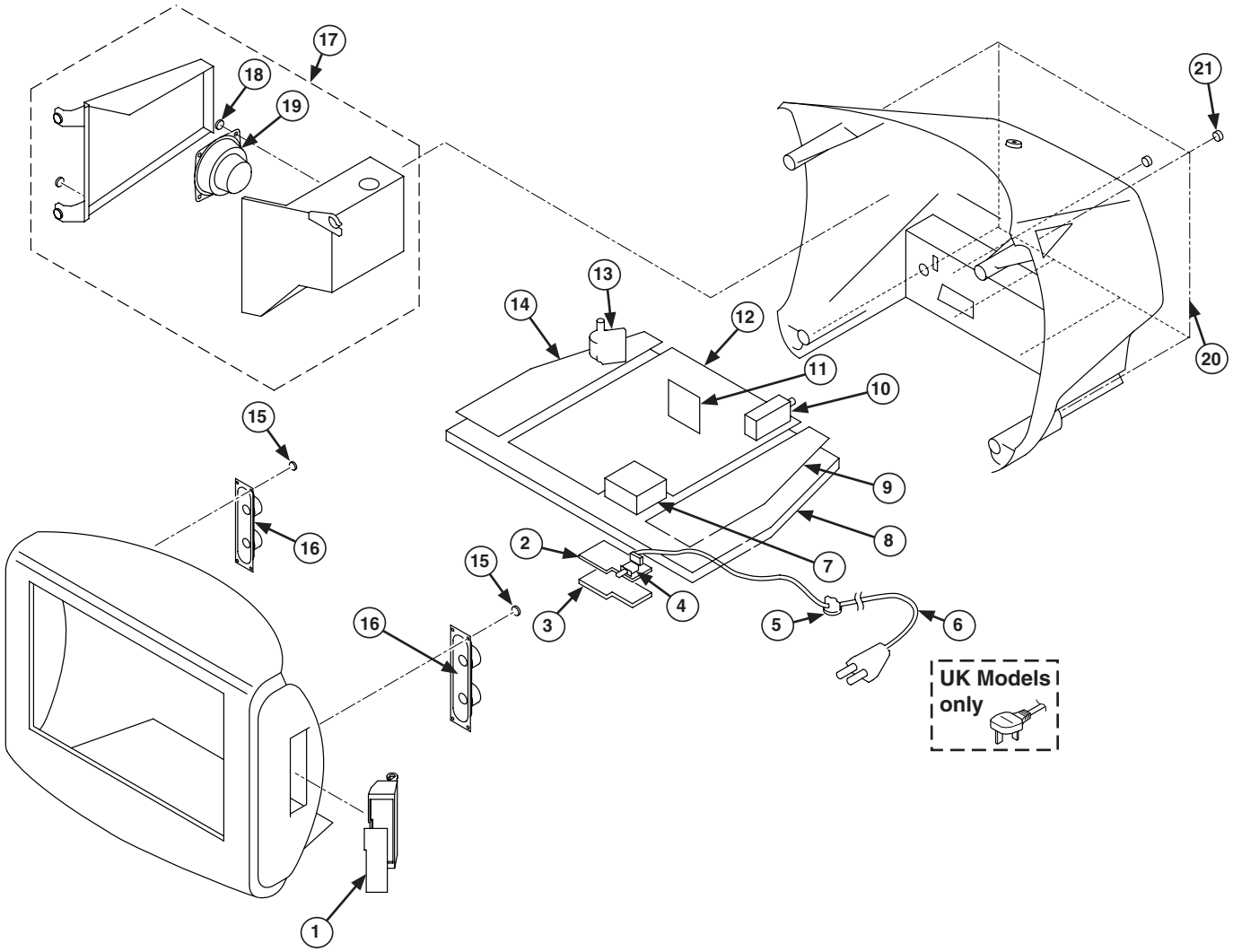
Note : Les composants indentifies par une trame et par une marque ⚠ sonte d'une importance critique pour la securite. Ne les remplacer que par des pieces du numero specifie.

Note : The components identified by shading and marked ⚠ are critical for safety. Replace only with the part numbers specified in the parts list.

NOTE :

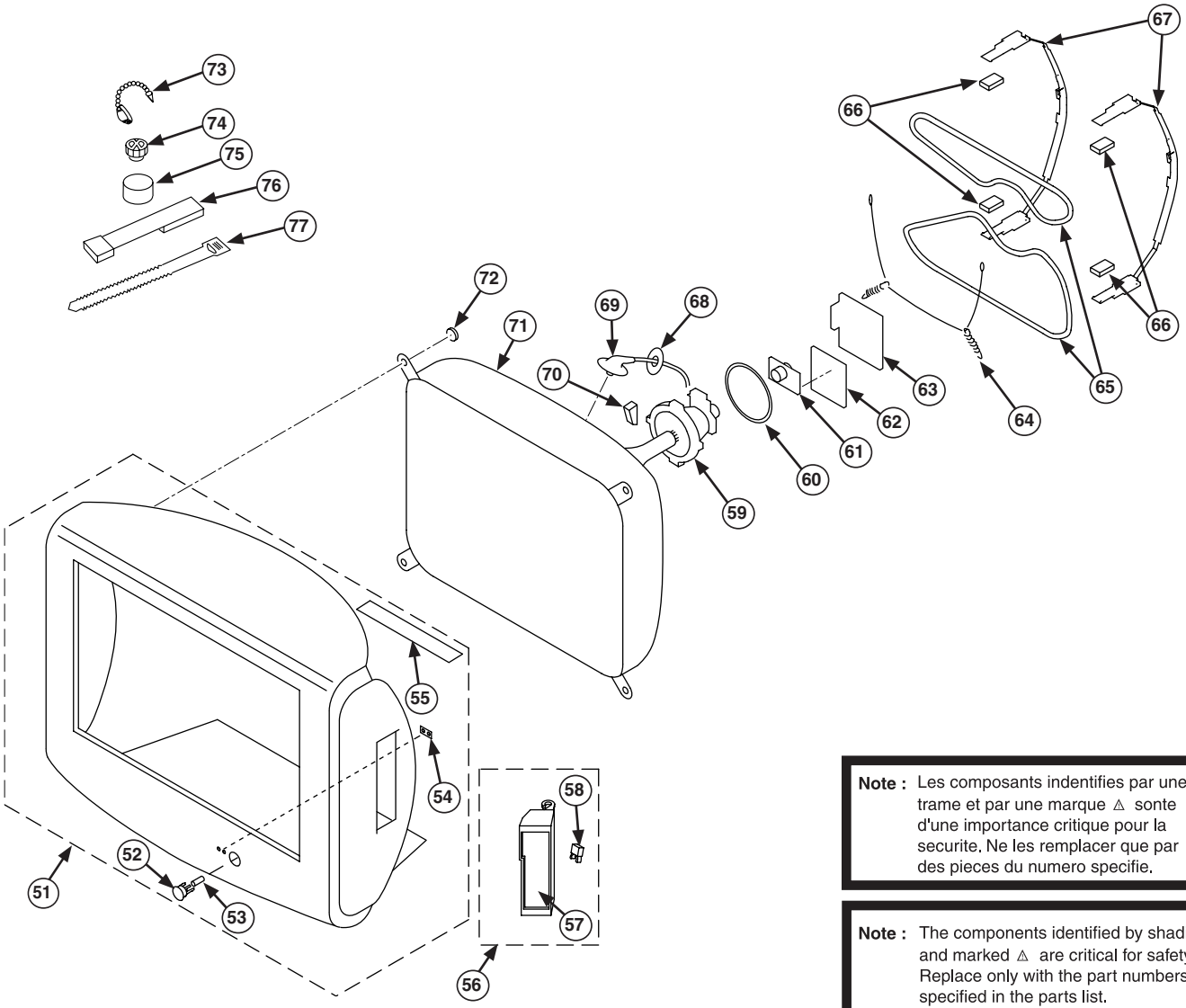
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remarks column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

6-1. CHASSIS



REF.NO.		PART.NO	DESCRIPTION	REMARK
1		*A-1647-043-A	H2 BOARD, COMPLETE	
2		*A-1624-102-A	F2 BOARD, COMPLETE	
3		*4-206-055-01	BRACKET F2	
4	⚠	1-571-433-21	SWITCH, PUSH (AC POWER)	
5		*4-202-531-01	AC CORD LOCK (SC)	
6	⚠	1-823-853-11	CORD, POWER (KV-28LS60B/28LS60E/32LS60B/ KV-32LS60E/32LS60K)	
	⚠	1-776-860-12	POWER CORD, FILTER (UK) (KV-28LS60U/32LS60U)	
7		1-424-855-11	COIL, CHOKE 29MMH	
8		*4-206-106-01	BRACKET, MAIN	
9		*A-1300-179-A	G BOARD, COMPLETE	
10		8-598-535-11	FRONTEND BTF-EF411 (KV-28LS60B/32LS60B)	
		8-598-533-01	FRONTEND BTF-EC411 (KV-28LS60E/32LS60E /32LS60K)	
		8-598-529-01	FRONTEND BTF-EU611 (KV-28LS60U/32LS60U)	
11		*A-1300-287-A	M BOARD, COMPLETE	
12		*A-1300-302-A	A BOARD, COMPLETE (KV-28LS60B)	
		*A-1300-175-A	A BOARD, COMPLETE (KV-28LS60E)	
		*A-1300-301-A	A BOARD, COMPLETE (KV-28LS60U)	
		*A-1300-288-A	A BOARD, COMPLETE (KV-32LS60B)	
		*A-1300-177-A	A BOARD, COMPLETE (KV-32LS60E/32LS60K)	
		*A-1300-289-A	A BOARD, COMPLETE (KV-32LS60U)	
13	⚠	1-453-383-21	TRANSFORMER ASSY, FLYBACK (NX-4522//Z214) (KV-28LS60)	
	⚠	1-453-340-31	TRANSFORMER ASSY, FLYBACK (NX-4522//Z2B4) (KV-32LS60)	
14		*A-1300-176-A	D BOARD, COMPLETE (KV-28LS60)	
		*A-1300-178-A	D BOARD, COMPLETE (KV-32LS60)	
15		7-685-663-71	SCREW +BVTP 4x16 TYPE 2 IT-3	
16		1-529-408-11	SPEAKER (4.2x24CM)	
17		*A-1678-219-A	WOOFER COMPL. ASSY	18-19
18		7-685-663-71	SCREW +BVTP 4x16 TYPE 2 IT-3	
19		1-529-989-11	SPEAKER (8CM)	
20		4-206-089-11	COVER REAR (KV-28LS60)	
		4-206-062-21	COVER REAR (KV-32LS60)	
21		7-685-663-79	SCREW +BVTP 4x16 TYPE 2 IT-3	

6-2. PICTURE TUBE



Note : Les composants indentifies par une trame et par une marque ⚠ sonte d'une importance critique pour la securite. Ne les remplacer que par des pieces du numero specifie.

Note : The components identified by shading and marked ⚠ are critical for safety. Replace only with the part numbers specified in the parts list.

REF.NO.		PART.NO	DESCRIPTION	REMARK
51		X-4039-915-1	BEZNET ASSY (KV-28LS60)	52-55
		X-4200-824-1	BEZNET ASSY (KV-32LS60)	
52		4-205-948-02	POWER BUTTON	
53		4-204-426-01	SPRING	
54		4-205-375-01	GUIDE, LIGHT	
55		4-204-295-01	SHEET, BLOTTING	
56		X-4200-712-3	DOOR ASSY (KV-28LS60)	57-58
		X-4039-993-1	DOOR ASSY (KV-32LS60)	
57		4-205-946-02	DOOR	
58		4-047-464-01	CATCHER, PUSH	
59	⚠	8-451-521-11	DEFLECTION YOKE (Y28RVC3-B) (KV-28LS60)	
	⚠	1-451-480-11	DEFLECTION YOKE (Y32RVC2) (KV-32LS60)	
60		1-419-363-11	COIL, NA ROTATION (RT200)	
61		8-453-011-11	NECK ASSY, (NA299-M)	
62		*A-1644-119-A	VM BOARD, COMPLETE	
63		*A-1638-158-A	C BOARD, COMPLETE	
64		4-369-318-21	SPRING, TENSION	
65	⚠	1-424-886-11	COIL, DEGAUSSING (KV-28LS60)	
	⚠	1-424-888-11	COIL, DEGAUSSING (KV-32LS60)	
66		4-203-390-11	CUSHION, DGC	
67		*4-204-768-01	HOLDER, DGC (29″)	
68		*4-203-022-01	HOLDER, HV	
69	⚠	1-251-946-21	CAP ASSY, HIGH-VOLTAGE (KV-28LS60)	
	⚠	1-251-374-32	CAP ASSY, HIGH-VOLTAGE (KV-32LS60)	
70		3-704-495-01	SPACER, DY	
71	⚠	8-735-099-05	PICTURE TUBE (W66LLX060X) (KV-28LS60)	
	⚠	8-735-079-05	PICTURE TUBE (W76LLZ060X) (KV-32LS60)	
72		4-046-765-12	SCREW, TAPPING 7+CROWN WASHER	
73		4-308-870-00	CLIP, LEAD WIRE	
74		1-452-094-00	MAGNET, ROTATABLE DISK; 15MM	
75		1-452-032-00	MAGNET, DISK; 10MM	
76		X-4387-214-1	PERMALLOY ASSY, CORRECTION	
77		3-701-007-00	BAND, BINDING	

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